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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/943,150	08/30/2001	Daniel P. DeLuca	01-415	8646

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EXAMINER

WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 07/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/943,150

Applicant(s)

DELUCA ET AL.

Examiner

Harry D Wilkins, III

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-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 12-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 24-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

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DETAILED ACTION

1. Claims 1-26 are pending. Claims 12-23 are withdrawn from consideration as being drawn to a non-elected invention.
2. The rejections under 35 USC 103 based on the Erickson reference have been withdrawn in view of Applicant's remarks regarding the bimodal distribution of gamma prime phases.
3. The rejection under 35 USC 112, 1st paragraph has been withdrawn in view of Applicant's remarks filed 27 May 2003.
4. New grounds of rejection are presented below.

Election/Restrictions

5. Applicant's election without traverse of group I, claims 1-11 and 24-26 in Paper No. 5 is acknowledged.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 2, 5, 6, 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Erickson (US 5,366,695) in view of Kenton (US 4,302,256).

Erickson teaches (see abstract and title) a single crystal nickel-based superalloy that contains 1.8-4.0 wt% Cr, 0.25-2.0 wt% Mo, 3.5-7.5 wt% W, 5.0-7.0 wt% Re, 7.0-10.0 wt% Ta, 5.0-7.0 wt% Al, 1.5-9.0 wt% Co, 0-0.15 wt% Hf, 0-0.5 wt% Nb

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(columbium), 0.1-1.2 wt% Ti and the balance Ni. Erickson further teaches (see col 2, lines 44-56) that the alloy may contain 0-0.04 wt% C, 0-0.01 wt% B, 0-0.01 wt% Zr and 0-0.1 wt% V. This composition overlaps the presently claimed range at 3.0-4.0 wt% Cr, 0.25-2.0 wt% Mo, 3.5-7.5 wt% W, 5.0 wt% Re, 7-10 wt% Ta, 5-7 wt% Al, 1.5-9.0 wt% Co, 0-0.04 wt% C, 0-0.01 wt% B, 0-0.01 wt% Zr, 0-0.15 wt% Hf, 0-0.5 wt% Nb, 0-0.1 wt% V and 0.1-0.7 wt% Ti. Regarding the presence of at least one of Ru, Rh, Pd, Os, Ir and Pt, the present claim recites a range of "up to 10 wt%" which includes zero addition of the element. Erickson teaches (see table 4) that the process includes a step of solutionizing wherein up to 100% of the γ' is taken into solution. Thus, the superalloy of Erickson is free from eutectic $\gamma - \gamma'$.

Though Erickson teaches (see col 37, lines 55-58) that the alloy is subjected to HIP (hot isostatic pressing) in order to facilitate "nearly complete pore closure" Erickson does not teach a step of HIPing that is at a pressure similar to that of the present invention. The "nearly complete pore closure" of Erickson does not mean pore-free.

Kenton teaches (see abstract) a method of removing cast defects, such as micropores, in superalloys by subjecting the alloy to an HIP treatment. Kenton teaches (see col 5, lines 58-68) that the HIP treatment occurs at 1800-2350°F at 5-50 ksi. This treatment improves the mechanical properties of the alloy, including (see col 5, line 68 to col 6, line 17) the substantially complete removal of defects such as micropores.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied the HIP treatment of Kenton to the alloy of Erickson because the HIP treatment of Kenton improves the mechanical properties of the alloy by removing casting defects

such as pores (see abstract and col 5, line 68 to col 6, line 17). Thus, the alloy of Erickson in view of Kenton is pore-free.

Regarding claims 2, 6 and 24, Erickson teaches (see col 11, line 63 to col 12, line 21) that the alloy is treated to produce primary gamma prime particles and also secondary gamma prime particles with an ultra-fine size. Thus, Erickson teaches an alloy with a gamma prime morphology with a bimodal γ' distribution.

Regarding claim 5, Erickson teaches (see title) that the superalloy is a single crystal.

Regarding claim 26, see above regarding claims 1 and 24.

8. Claims 3, 4, 7-11 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Erickson (US 5,366,695) in view of Kenton (US 4,302,256) as applied to claims 1, 2, 5, 6, 24 and 26 above, and further in view of DeLuca et al (US 5,605,584).

As described above, Erickson in view of Kenton teach the eutectic γ - γ' free and pore free super alloy as claimed.

Erickson in view of Kenton do not teach the sizes and volume percent distribution of the γ' precipitates as claimed. However, given the teaching of Erickson (see col 11, line 66 to col 12, line 21), it would have been within the expected skill of a routineer in the art to adjust the γ' aging condition in order to obtain a desirable γ' particle size such as that disclosed by DeLuca et al.

DeLuca et al teach (see abstract) forming a bimodal γ' precipitate distribution in a superalloy. The large particles had (see col. 3, lines 29-45) size of about 5-15 microns

and were preferably present (see claim 6) at about 30-40% by volume. The small cuboidal particles have size of about 0.3-0.7 microns.

Therefore, it would have been obvious to one of have incorporated the bimodal γ' precipitate distribution of DeLuca et al in the alloy of Erickson because the bimodal γ' distribution provides (see abstract) a microstructure that was damage tolerant, thus leading to a longer workpiece lifetime.

Regarding claims 4 and 11, DeLuca et al teach (see col. 3, lines 33-34) that the smaller γ' precipitates are cuboidal in shape. DeLuca et al teach (see col. 3, lines 44-45) that the large γ' precipitates have a branched configuration with three or four branches. The four-branched precipitates are "octet-shaped" precipitates as claimed.

Response to Arguments

9. Applicant's arguments with respect to claims 1-11 and 24-26 have been considered but are moot in view of the new ground(s) of rejection.

10. Applicant's arguments filed 27 May 2003 have been fully considered but they are not persuasive. Applicant argued that Erickson does not necessarily impart a eutectic γ - γ' free alloy. In response, alloy 10D of Erickson is within the claimed composition and it *can* achieve a 100% solutionization of the γ phase. Therefore, Erickson teaches an alloy with the claimed composition that is eutectic γ - γ' free. A complete solutionizing of the γ' phase would be an indication that the alloy was eutectic γ - γ' free. Applicant also argues that there is no teaching in Erickson that would lead one of ordinary skill in the art to achieve the claimed particle shapes and sizes. However, Erickson expressly teaches (see col 11, line 66 to col 12, line 21) that it is within the skill of a routineer in

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the art to adjust the aging steps to achieve a desired shape and distribution of particles. Thus, there is a teaching that adjusting the aging steps to achieve desired results was within the skill of a routineer in the art. When viewed in combination with the bimodal γ distribution of DeLuca et al, a *prima facie* case of obviousness is established.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 703-305-9927. The examiner can normally be reached on M-Th 10:00am-8:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 703-308-1146. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Harry D Wilkins, III
Examiner
Art Unit 1742

hdw
July 7, 2003

ROY KING 
SUPERVISORY PATENT EXAMINER
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